

*Proposed Scheme for the Collection, Treatment, and Disposal of
the Sewage of Glasgow.* By D. M. NELSON.

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THE problem of how to deal with the sewage of the City of Glasgow, while preserving the purity of the River Clyde, has long occupied the attention of eminent engineers, chemists, and other scientific experts, involving much scheming, labour, and expense, while yielding little else than the fruits of bewilderment and uncertainty as to the successful issue of any one or other of the various processes and methods propounded. Absence of continuity in the schemes promulgated has tended greatly to puzzle the public mind, caused in great measure, as it may be said, by the chemist stepping on where the engineer stepped off, and *vice versa*, instead of journeying on together through the work from the inception to the termination. Without desiring to disparage or question the utility of any of the schemes, I may say that the one I am about to describe has novelty, feasibility, and economy to commend it.

I propose to divide the city into four districts, two north side and two south side of the river. No. 1, being called north-east, starts from the foot of Dixon Street (St. Enoch Square), running parallel with, and conveniently close to, the river and round north side of Glasgow Green, on eastward to a site somewhere on or near the lands of Dalmarnock. No. 2, being north-west, starts also from the foot of Dixon Street, running westward, parallel, and conveniently close to, the river and round by the Queen's Dock to a site somewhere on the lands of Merklands or Whiteinch. No. 3, being south-east, starts from the foot of South Portland Street, running eastward, parallel with, and conveniently close to the river to a site on or near the lands of Shawfield. No. 4, being south-west, also commences at the foot of South Portland Street, running westward, parallel with, and conveniently close to, the river, onwards to a site near Fairfield.

This system of dividing the city into four districts somewhat equal in extent, yet each possessing features peculiar to itself, has

many advantages to recommend it, as one or other of the districts might be selected for experiment upon a moderate scale, and afterwards altered or enlarged as matured experience may justify. Finally, all the stations may be proceeded with and adapted, separately or conjoined, to the process calculated to give the best results. While I express no favour for the processes of direct irrigation or filtration as regards Glasgow, I am prepared to admit that it would be difficult to find in the same area four districts, three at least of which possess facilities so favourable to the treatment of sewage in a variety of ways, and all so capable of being extended mechanically to meet the requirements of those outlying burghs which may be conveniently embraced within the radius of the proposed extension of the district.

A description of one of the stations or districts will suffice in a general way to illustrate all four. I take the north-east section. Starting from foot of Dixon Street I proceed to lay an intercepting canal or conduit, composed of steel plates formed into tubes, each measuring 21 to 25 feet long by 3 feet to 5 feet area, oval in section, with flanged ends bolted to each other and rendered tight by means of a patent elastic joint, so useful in adapting itself to any movement of downward pressure and subsidence or inequalities in the ground. I have formed a preference for such pipes made from steel plates, ribbed and rivetted together, by reason of their cheapness, lightness, and durability, also by reason of the ease and rapidity with which they can be laid and fitted in the track. Even apart from the very great saving here, there will also be in the excavating of ground and shoring of trenches for their reception a saving of nearly one-third as against any other ordinary system of sewerage; and as I am not aware of any one having preceded me in the proposal to employ this form of steel pipeage for the conveyance of Glasgow sewage, and when it is known that its use will effect a saving of about a hundred thousand pounds, it should not be lost sight of, and should act as a stimulant in having the work proceeded with at once.

This steel conduit will be increased in area as it extends towards the sewage station, so as to carry forward what it receives in intercepting the various sewers and covered burns on its line of march. I may state that I have contrived a method whereby storm, rain, and harmless surface-waters may be largely separated and diverted from the crude and offensive sewage, and, after

simple filtration, caused to travel at once into the river, instead of flowing on—as it otherwise would do—to the sewage works, causing a wasteful decrease of manurial value, entailing cost of superfluous pipeage and unduly large filtering tanks, not to speak of the wasteful absorption of chemicals and the additional expense that would be entailed by pumping such a vast quantity of useless liquid.

Having thus briefly described my mode of interception and collection of the sewage, I will now describe the treatment of it at the works. The contents of the conduit may either fall by gravitation, or be pumped into a large tank or reservoir supplied with deodorising chemicals, whereby the sewage may at once be rendered innocuous and free from disagreeable smell—the light or surface effluent flowing off through a series of wood grids into another tank, where it is subjected to the action of chemical and mineral substances, and ultimately drawn off and raised by centrifugal or other force to the uppermost of a series of tanks, built above each other, so as to yield a head of pressure and economise ground space, from which it is allowed to flow irregularly through one deposit of purifying material after another, until it reaches a given point—deodorised, filtered, clarified, and chemically pure. It may then either be syphoned into the river, or, more properly, made serviceable to the adjoining factories for boiler-feeding or manufacturing purposes. The heavy or sludge portions of the sewage, being left behind to settle, are then immediately passed through a series of close vessels into deodorising and precipitating tanks, filtering to a condition when it may be pressed into a semi-dry mass, free from disagreeable odour. Following this it may be filter-pressed into cakes or blocks, and allowed to harden in a moderately-heated dry atmosphere, then sawn or ground down to the consistency of rough sand or gravel, and filled into bags, and in this convenient form kept ready for transit to country districts, where it may be scattered over the land as manure.

As regards the cost of the proposed scheme, I may state that an intimate acquaintance with engineering and contract work for thirty years past enables me to reckon that something short of half-a-million of money, the least of the sums yet named, will complete the system now suggested, and fully equip the four district stations which I regard as requisite to carry on the work affecting us as citizens.



